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Modeling the moderation role of brand reputation in the relation between perceived risk and customers' online shopping behavior in Egypt

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Abstract:

The main objective of this research was to investigate the moderating role of brand reputation in the relationship between perceived risk and customers' behavior in online shopping. The study focused on customers of online stores in Egypt. Employing an analytical descriptive approach, data were gathered from 474 customers through an online questionnaire. Statistical analysis was conducted using SPSS V 22 and AMOS V 22 software, with structural equation modeling utilized for hypothesize testing. Results indicated a significant negative impact of perceived risk dimensions (financial risk and non-delivery risk) on both brand reputation and online shopping behavior. Moreover, brand reputation was found to positively influence online shopping behavior and also served as a moderator between perceived risk dimensions and online shopping behavior. The study further contributed by developing the "Perceived Risk Reduction" (PRR) model as a theoretical implication.

Keywords— Perceived risk reduction model (PRR), E-Commerce, Online Shopping Behavior, Brand Reputation, Perceived Risk.

1. Introduction:

In the Middle East and North Africa region, Egypt stands out with the largest population of internet users (International Trade Administration 2022). The growth in internet users within Egypt has been remarkable, soaring from a mere 0.6% of the population to a substantial 71.9% between 2000 and 2020 (International Telecommunication Union 2022). Furthermore, Egypt's e-commerce sector ranks prominently, holding the position of the second-largest market in the Middle East and North Africa, the fourth-largest in Africa for financial technology investments, and the 39th largest globally in 2021 (International Telecommunication Union 2022). The prevalence of online purchases in Egypt is significant, with an average weekly percentage of 42.3% in 2021. This resulted in a substantial increase in online shoppers, reaching 48.49 million users, marking a notable rise of 17.2% from the preceding year. Particularly noteworthy is the reliance on online opinions during the Covid-19 pandemic, with 43.2% of individuals turning to online sources for guidance (Information and Decision Support Center 2022).

The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) introduced various factors influencing e-buying behavior (Venkatesh et al. 2003), including behavioral intention, expected performance, expected effort, available facilities, and perceived risk (Pavlou 2003). Notably, perceived risk plays a significant role in shaping consumers' behavioral intentions and purchase decisions, with higher perceived risk leading to lower probability of purchase (Wai et al. 2019). Despite the convenience of online shopping, consumers often concern about perceive risks associated with it (Yousafzai, Pallister, and Foxall 2003). In particular, the lack of control over information privacy in the online environment significantly affects consumers' willingness to shop online (Yahya et al. 2020; Yousafzai et al. 2003). This is evidenced by the fact that 80% of Egyptian e-commerce transactions still rely on cash on delivery rather than online payment (International Trade Administration 2022), reflecting a lack of confidence in electronic transactions. In contemporary internet markets, managers place emphasis on brand reputation as a means to mitigate risks based on customer feedback (Hayne, Wang, and Wang 2015).

Seeking for eliminating or even reducing perceived risk concerned with online shopping, past research proposed different factors such as qualities of data introduction, routing, and request satisfaction in an intuitive shopping medium (Reynolds, 2000), trust, customer service, web design and safety (Giao ,2020). But little is known about what is called **Brand Reputation** as a tool for risk restriction based on customer feedback (Hayne et al., 2015). Brand reputation played a positive role in enhancing customer behavior toward online shopping (Agmeka et al., 2019; Dai et al., 2018; Rani & Suradi, 2017; Tong, 2011; Wang et al., 2021).

The role of brand reputation in eliminating or reducing the negative impact of perceived risks on online shopping has not been verified through the literature review. Therefore, This study seek to clarify the mechanism of reducing perceived risk associated with online behavior and in turn increasing consumer behavior toward online shopping via marketing stimuli such as brand reputation.

So that, this study aimed to investigate the impact of perceived risk (PR) on customers' online shopping behavior and to investigate the extent to which brand reputation (BR) moderates the relationship between perceived risk and customers' online shopping behavior.

2. Theoretical background:

2.1. The theory of perceived risk:

Several studies have been aimed to investigate the key dimensions of perceived risk in a different research area. In the business field, perceived risk has a vital point in studying customer behavior and attitudes. Multiple theories seek to interpret the perceived risk in the area of B2B or B2C transactions.

In the 1960s, there were attempts to explain the perceived risk by (Bauer, 1960; Cox, 1967; Kogan & Wallach, 1964), The contributions provided during this period established the basis of the **Perceived Risk Theory**. Where perceived risk was known as a state of uncertainty about the outcomes of purchasing decisions taken by the individual in the future (Cox & Rich, 1964). Two basic elements were used to interpret the dimensions of perceived risk: financial and social-psychological risk (Cox, 1967) in (Stern et al., 1977). Also Cunningham (1967) stated two essential components in anticipating overall risk. Coleman's model estimated the overall risk according to the combination of the uncertainties and the risk consequences from the customer's decision. Coleman's model can be formulated in the following equation:

$$\text{Overall risk} = \text{uncertainty} \times \text{danger of consequences.}$$

In 1970s, Further factors were provided as an extension for the perceived risk theory in order for understanding the perceived risk of purchasing. Taylor (1974) noted that the theory of perceived risk is related to **The Theory of Consumer Behavior**, while the cornerstone of a problem for consumer behavior is choice, since each choice situation has two separate types of risk involved in the decision. Taylor (1974) developed "**Risk Taking in Consumer Behavior Theory**" which it going to predict customer behavior by "Customer factor and choice situation factor". Although Peter and Ryan (1976) indicated that there are two essential associated factors for estimating total risk, which are the likelihood of losing money from a specific brand purchasing decision multiplied by the negative consequences of that decision. Peter & Ryan's model can be formulated in the following equation:

$$\text{Overall risk} = \text{Probability of loss for brand} \times \text{negative consequences.}$$

(Peter & Tarpey, 1975) indicated that Perceived risk has two major components: 'a chance,' which focuses on the likelihood of 'loss,' and 'danger,' which focuses on the intensity of the negative effects. Jacoby and Kaplan (1972) pointed out that variety of aspects, including Functional risk, Performance risk, Physical risk, Psychological risk, Social risk, Financial risk contributed to the interpretation of "overall perceived risk", these aspects associated with Shopping Behavior.

In 1980s, (Evans, 1982) developed *The Perceived Risk Model* based the *Equity Theory* based on (Peter & Tarpey, 1975) contributions, which investigate the customers' brand preference and how to predict customer behavior. Also, (Dowling, 1986) investigated earlier models for measuring perceived risk and developed a new equation for measuring Overall Perceived Risk based on *The Decision Theories* for further Risk's understanding as follow:

$$OPR = f \sum_{i=1}^n (\text{Probability of loss}_i \times \text{Importance of loss}_i)$$

Where: OPR= Overall Perceived Risk, n = the number of times of loss i

According to Dowling (1986) investigations, risk is a circumstance in which the decision-maker is aware of the outcomes of alternatives and the likelihood that they will occur beforehand, But the case in which the customer does not know the consequences of the alternatives nor the possibilities of their occurrence, it is known as the perceived risk.

In 1990s, with similar extent, the measures used to investigate perceived risk in business transactions are similar. Furthermore, it is stated in a set of dimensions, namely perceived performance risk, perceived financial risk (Wood & Scheer, 1996).

In 2000s, researchers focused on the factors related to customer purchasing behavior, they emphasize that there are a set of indicators that illustrate the dimensions of the customer's perceived risk of purchasing. Where (Pavlou, 2003) referred that Perceived risk had two components: technological risk caused by infrastructure and relational risk caused by service providers' behaviors. The Extended E-Commerce Acceptance Model referred by Crespo, Del Bosque, and Sánchez (2009) used the Technology Acceptance Model is taken as a reference framework, that includes the diverse constructs of perceived risk: financial, performance, social, time, psychological and privacy. Which can be illustrated as follow:

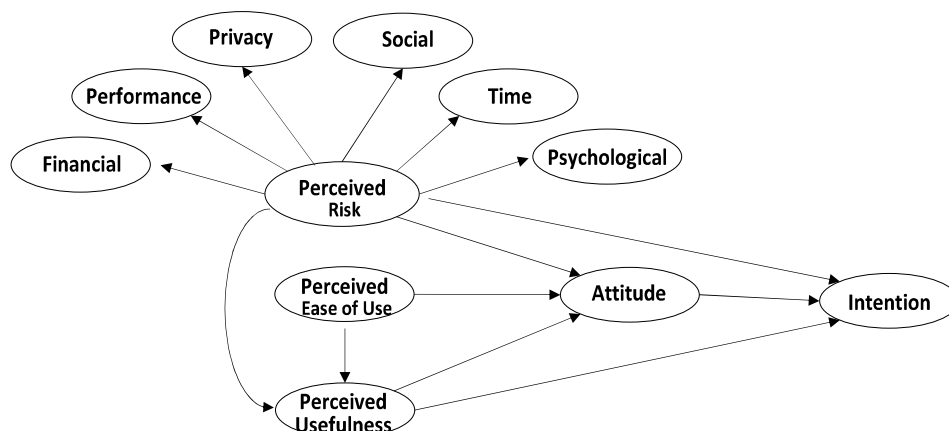


Figure 1. The Extended E-Commerce Acceptance Model Source: Adapted from (Crespo et al., 2009)

The eight dimensions model of consumer perceived risk was developed by Zhang et al. (2011) have investigated such crucial components of perceived risk in the overall B2C process, as well as the effects of each on customer purchase behavior. And conclude to the following dimensions: Perceived Social Risk, Perceived Economic Risk, Perceived Privacy Risk, Perceived Time Risk, Perceived Quality Risk, Perceived Health Risk, Perceived Delivery Risk, Perceived After-sale Risk as a dimension of the overall perceived risk which related to the customer purchase behavior.

The trending issue in the area of online shopping (B2C); Tham et al. (2019) used Financial Risk, Product Risk, Convenience Risk, Non-delivery risk, Return Policy risk as a dimensions of overall perceived risk. Bahl and Kesharwani (2020) Referred that reviewing perceived risk in Indian's marketing literatures illustrated out eight dimensions; financial risk, performance risk, physical risk, social risk, convenience risk , psychological risk, privacy risk , and source credibility risk. Regarding to perceived risk in the customer's perspective associated with e-shopping on the Website or through electronic businesses on the Internet, researchers provided a set of dimensions to measure the customers' perceived risk, which it can be summarized in the following table:

Table 1: Perceived risk dimensions in online shopping studies

Author(s)	Financial risk	Product risk	Privacy and security	Non-delivery risk	Return policy risk	Convenience Risk	Perceived time risk	Social risk	psychological risk	Application	Area
(Tham et al. 2019)	×	✓ (+)		✓ (-)	✓ (+)	✓ (+)				Malaysia	online consumer behavior of Malaysian consumers
(Almoussa, 2014)	✓ (-)	✓ (-)								Saudi Arabia	online shopping behavior
(Crespo et al., 2009)	✓ (-)		✓ (-)							Spain	Internet users in web shopping
(Javadi et al., 2012)	✓ (-)	✓ (+)		✓ (-)						Iran	online shopping behavior
(Khedmatgozar & Shahnazi, 2018)	✓ (-)	✓ (-)	✓ (-)							Iran	intent to adopt CIB internet banking

Continued →

Author(s)	Financial risk	Product risk	Privacy and security	Non-delivery risk	Return policy risk	Convenience Risk	Perceived time risk	Social risk	psychological risk	Application	Area
(Masoud, 2013)	✓ (-)	✓ (-)	✓ (-)	✓ (-)			×			Jordon	online shopping
(Qalati et al., 2021)	✓ (+)	✓ (+)	✓ (+)							Pakistan	online purchase intention
(Wai et al. 2019)	✓ (+)	✓ (-)		✓ (-)	✓ (-)					Malaysia	online shopping behavior
(L. Zhang et al., 2011)	×	✓ (-)	×	✓ (-)			✓ (-)			China	customers who had shopped on B2C websites
(Bhatti & Rehman, 2019)		✓ (+)	✓ (+)			✓ (+)				Pakistan	Online shopping behavior
(Ariff et al. 2014)	✓ (-)	✓ (-)		✓ (-)		✓ (+)				Malaysia	Online shopping behavior
(Gazali and T. Y. S. Suyasa 2020)	✓ (-)	✓ (-)	✓ (-)	✓ (-)			✓ (-)	✓ (-)		Indonesia	Consumers Who Use Online Shopping Technology
(Munikrishnan et al. 2023)	✓ (-)	✓ (-)					✓ (-)		✓ (-)	Malaysia	Online Purchase Intention
Negative effects frequencies	8	8	4	7	1	0	3	1	1		
Positive effects frequencies	2	4	2	0	1	3	0	0	0		
Non-significant frequencies	2	0	1	0	0	0	1	0	0		
All frequencies	13	13	8	7	2	3	4	1	1		

Notes : ✓ = Significant, ×= Non-Significant, (+) = Positive Relation, and (-) = Negative Relation

Source: developed by the authors

Based on the previous table, the frequencies of the effect results of the perceived risk dimensions on electronic shopping, were used to identify the most relevant dimensions used to measure the perceived risk used to measure the perceived risk variable. We note that, in light

of the current trend in electronic shopping, the four sub-dimensions can be used to measure perceived risk, which can be illustrated in the following graph

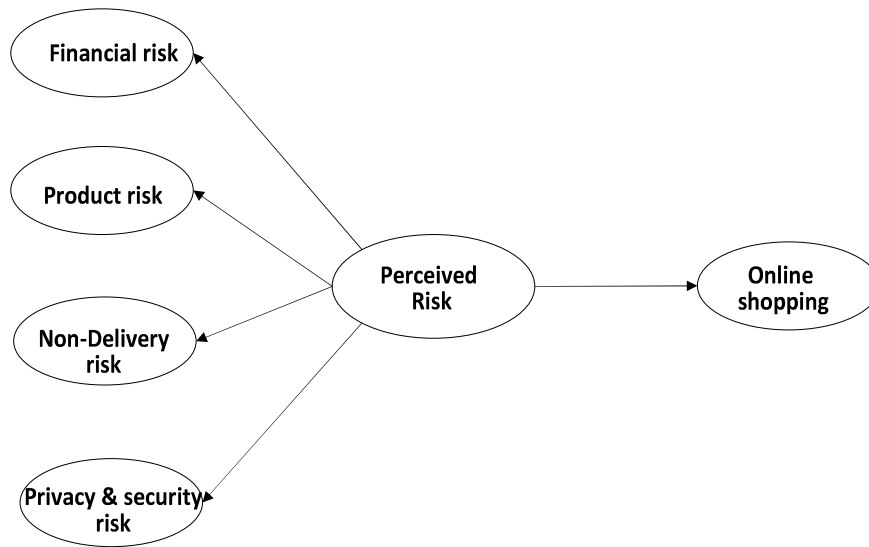


Figure 2. The four dimensions' perceived risk model for online shopping

Source: adopted from previous review

2.2. Perceived risk: Overall perceived risk:

Perceived risk is used mostly in the marketing and sales area, it refers to the nature and amount of risk perceived by a consumer in contemplating decision, while it defined as the kind and degree of risk a consumer perceives when considering about a certain purchase behavior (Cox and Rich 1964). Also, Jacoby and Kaplan (1972) pointed out that overall perceived risk considers all sorts of factors explain how risky it is to buy an unfamiliar brand.

Perceived risks have been handled in the context of online purchasing as a condition of uncertainty during, or after the purchase process. Whereas Chang and Luo (2010) defined it as the uncertainty that consumers have to face in the process of buying products or service because they can't foresee the result of their purchase decisions. And Masoud (2013) defined it as a fundamental concern of decision-making process during online shopping (Masoud 2013). Whereas Kim, Ferrin, and Rao (2008) defined it as the consumer's belief about the potential uncertain negative outcomes from the online transaction. Similarity with Wang et al. (2018) while it's known as the consumers' attitude concerning the potential uncertainty and negative consequences of buying certain products. Or the extent to which consumers perceive the possible losses that could be created due to the uncertainties of using mobile payment Yang et al. (2015), and it known as the consumer's perceptions of the uncertainty and adverse

consequences of buying a product (or service) (Hsieh and Tsao 2014), While it known as a combination of uncertainty and seriousness to the adoption of e-commerce for internationalization Cook, Duan, and Krivokapic-Skoko (2021). Based on the previous review, we can define Perceived risk in online shopping as: *“The case of uncertainty from negative consequences of online shopping”*.

2.3.Financial risk:

E-shopping involves e-payment for the good or service obtained, and since the purchase process takes place as an e-payment, the e-payment process that goes with online shopping involves financial risks due to the use of the Internet. Additionally, the risks associated with technology usage may result in financial loss. So that consumers might be worried regarding online safety and security in the use of their credit cards and disclosure of personal information (Tham et al. 2019).

Jacoby and Kaplan (1972) defined financial risk as the chances that you stand to lose money if you try an unfamiliar brand, or the risk of the possibility of monetary losses or that the product/service will not be worth the financial price (Yousafzai et al. 2003). Also, it happened when customers are concerned that their personal financial information will be available to others online and used for fraudulent purposes (Yousafzai et al. 2003). Sulistyowati et al. (2021) defined is as the dangers of using open internet infrastructure to change personal information. website advertisers or accredited parties responsible for ensuring a website’s reliability can also recommend payment protection (Tran 2020). However, retailers seek to avoid the financial risks associated with the e-purchase process by allowing customers to pay using cash-on-delivery method. Based on the previous review, we can define financial risk in online shopping as: *“The extent to which customers may be overcharged more than the advertised price”*.

2.4.Product risk:

Online shopping had higher risk compared to traditional store shopping (Tran 2020). These potential risks may include fake stores or the diss-matching between the advertisement on the online store with the actual product. Whereas Online shoppers could be unsure if they will receive the exact same item that is displayed in the online stores or if it will meet their expectations (Abrar, Naveed, and Ramay 2017). product risk also, relates to the performance or quality of goods and services that consumers choose through online shopping (Tham et al.

2019). Or are those more towards those goods that do not have after-sales service (Tham et al. 2019). Which influence of cognitive attitudes on online shopping (Tran 2020).

Yousafzai et al. (2003) defined it as the risk of potentially unsafe product/service or the product/service will lower the consumer's self-image. Or the possibility that the product bought might face malfunction and the quality is below the expected level (Kim et al. 2008). Based on the previous review, we can define it as: *"The extent to which the advertised product's quality or performance doesn't match the actual product"*.

2.5.Non-Delivery risk:

Some issue of online shopping, products do not delivery to the customer, and this may be due to an incorrect customers' address, or products may be lost in one of the delivery chains. Others point out that the risks of non-delivery can be represented in not delivering in a timely manner (Koyuncu and Bhattacharya 2004; Tham et al. 2019), or in the right place (Hong, Zulkiffli, and Hamsani 2016).

Online shoppers are often concerned that they will not receive the product after purchase Tham et al. (2019). Or they worry that their goods cannot be received on time (Wai et al. 2019). And it known as the probability of not getting the product after completing online transaction and making payment to the online store (Abrar et al. 2017). Based on the previous review, we can define it as: *"The probability of non-receiving the purchased product in the right place or in a timely manner"*.

2.6.Privacy & security risk:

In the context of e-commerce, the website or mobile application serves as a virtual mediator between the seller and the buyer, allowing the transaction to be completed. However, sometimes websites or mobile applications are exposed to technical defects that could lead to a loss of control over and protection for customer data. Therefore, the customers find some anxiety associated with the possibility of losing or not protecting their financial or personal data. This anxiety is described as Privacy and security risk.

Thus, customers who perceive fewer risks or concerns about online purchasing are expected to make more purchases online than more risky consumers Miyazaki and Fernandez (2001). Whereas internet privacy and security issues are inescapably linked and, when all taken together, customer may stop online purchasing (McCole, Ramsey, and Williams 2010). Yousafzai et al. (2003) defined security as a threat which creates "circumstance, condition, or

event with the potential to cause economic hardship to data or network resources in the form of destruction. And it defined Perceived privacy as the customer's perception regarding their ability to monitor and control the information about themselves. Based on the previous review, we can define it as: *"The degree of concern that the customer finds about the possibility of losing or not protecting personal or financial data during online shopping"*.

2.7. Brand reputation:

Company brand is considered as a distinguishing tool used to identify the company and its products during customers preference for purchased product. The brand's reputation is associated with customer perceptions and customer opinions. The company's good reputation is shaped after a set of accumulation of good customers' buying experiences. Thus, the risks that could affect customers are relatively less whenever the company's brand has a good reputation.

Brand reputation means customer trust on company product and feel good about purchasing goods or services of a specific company (Santoso 2021), or view of a particular brand in front of public, whether its reputation is good or bad in view of the public (Sharma, Daga, and Gemini 2020). In addition, it refers to the promises of performance that had been offered by organization (Harun et al. 2021), or the opinion of others that the brand is good and reliable (Siringoringo and Murdani 2020), also it refers to the positive or negative value judgments that are revived in the minds of all people about other people, brands and organizations (Köktener, Gumus, and Şahar 2020), and it refers to how a specific brand (for individual or company) is perceived by others (Negara et al. 2020). Or how good a given brand is perceived in the market, and evaluated by users on the social media platform (Zhang et al. 2013). Whereas a brand with higher reputation is likely to attract more attentions and positive comments from their fans. In contrast, a lower reputation brand is likely to receive more non-positive comments (Zhang et al. 2013). Based on the previous review, we can define it as: *"The accumulation of customers' buying experiences toward a specific brand"*.

2.8. Online shopping behavior:

Traditional commerce has increasingly declined in recent times, whereas commercial transactions over the Internet have increased. This is related to numerous benefits that sellers and consumers receive from e-commerce, such as the convenience which customers can find in the price comparison between products and the ease with which they can access the website or

considering the reviews and experiences of previous customers. Sellers, also prefer e-commerce due to the possibility of advertising their product to a larger number of buyers without being limited by place or incurring additional storage costs in the event of increased trade.

Aside from that, online shopping behavior refers to the extent to which consumers visit, browse, shop, transact, and repeat that behavior (Liu and Wei 2021), also it refers to the process of purchasing products and services over the internet (Utami, Wati, and Mulatsih 2021), or it known as the consumer's psychological state in terms of making purchases on the Internet (Dash, Dash, and Mahapatra 2013), also it refers to the process of purchasing intention of products or services via the Internet or web (Chusminah et al. 2020; Malik and Guptha 2013; Ray, Mukherjee, and Bag 2020, 2021; Sahetapy, Kurnia, and Anne 2020). Based on the previous review, we can define it as: *“The processes in which customers purchase their product via the internet”*.

3. Literature review and hypotheses development

3.1. Perceived risk and online shopping behavior:

Due to the virtual nature of online stores, customers often lack certainty about the outcomes of their purchase decisions in e-shopping. Consequently, customers typically cannot evaluate their purchases until they have received the product. During this process, perceived risk commonly affects purchase decisions, leading customers to hesitate in their buying decisions by heightening their perception of risk. Research generally indicates a negative correlation between perceived risk and online shopping, suggesting that increased levels of perceived risk tend to discourage customers from making purchases (Almoussa 2014; Crespo et al. 2009; Gazali and Suyasa 2020; Khedmatgozar and Shahnazi 2018; Masoud 2013; Munikrishnan et al. 2023), so that we can develop the 1st hypothesis as follows:

H1: Perceived risk has a negative significant impact on consumers' online shopping behavior. In the following, we will review the studies which investigated the impact of perceived risk dimensions (financial risk, product risk, non-delivery risk, privacy and security risk) on online shopping.

3.1.1. Financial risk and online shopping behavior:

Many studies agreed that financial risks had a negative impact on online shopping behavior (Almoussa 2014; Crespo et al. 2009; Gazali and Suyasa 2020; Javadi et al. 2012; Khedmatgozar and Shahnazi 2018; Masoud 2013). Where The Extended E-Commerce Acceptance Model referred by (Crespo et al. 2009) analyzed the impact of financial risk on e-commerce adoption

by end consumers in Spain, they found that intention to shop online is negatively influenced by web-related risks, with financial risk having a greater influence. The study highlights the importance of considering risk dimensions in e-commerce adoption. Masoud (2013) aimed to investigate how financial risk affected Jordanian consumers' online shopping habits, The study indicated that financial risk had a negative effect on internet shopping behavior. while Khedmatgozar and Shahnazi (2018) tried to examine the factors affecting adoption of CIB internet banking based on the perceived risk theory, the results showed that there was a negative relationship between financial risk and clients' intent to adopt with CIB internet banking in Iran. In addition, Javadi et al. (2012) investigated the elements influencing Iranian customers online shopping behavior, they concluded that people's attitude toward internet purchases were influenced negatively by financial risk. Thus, fear of losing money and financial details has negative effect on attitude toward online shopping, Customers' attitude toward online purchasing were also found to influence their online purchasing behavior, according to the study. Almousa (2014) also investigated the perceived risk effect on Saudi Arabian consumers' online purchase behavior. The findings indicated that the financial risk has a significant negative impact on consumers' attitude and intention to shop over the internet. The study's findings also referred that customers' financial risk reduces consumers' intention to buy online. Gazali and Suyasa (2020) referred to a negative and significant relationship between financial risk and purchase decision on online shop consumers in Indonesia. That an increase in financial risk by consumers while shopping online would result in a decrease in consumers' willingness to shop online.

Unlike, Qalati et al. (2021); Tham et al. (2019) they found that financial risks had a positive effect on purchasing behavior from online stores. While Qalati et al. (2021) reported that a positive effect for financial risk on purchasing decision making among Pakistani online shoppers. that an increase in financial risk by consumers while shopping online would increase consumers' propensity to shop online. Tham et al. (2019) as well examined the impact of financial risk on online consumer behavior of Malaysian consumers, they indicated that financial risk has a significant and negative impact on online shopping behavior.

Aside of that, a set of studies suggested that financial risks have no effect on purchasing behavior from electronic stores (Tham et al. 2019a; Zhang et al. 2011). Where Tham et al. (2019) referred that financial risk didn't had a significant effect on online consumer behavior of Malaysian consumers, also Zhang et al. (2011) referred that financial risk didn't had a significant effect on online behavior of Chinese consumers who had shopped on B2C websites. The literature review suggests a negative relationship between financial risk and online shopping. Based on the previous review, we can develop the following hypothesis:

H1.1: Financial risk has a negative significant impact on consumers' online shopping behavior.

3.1.2. Product risk and online shopping behavior:

In terms of the impact of product risks on consumers' online shopping behavior on online stores, the majority of studies concluded that product risks have a negative impact on customer purchase behavior from online stores (Gazali and Suyasa 2020; Masoud 2013; Zhang et al. 2011) , where (Masoud 2013) aimed to investigate to what extend product risk effect on decision-making process during online shopping in Jordon, he indicated that product risk had a negative effect on online shopper behavior. Also, (Gazali and T. Y. S. Suyasa 2020) referred to a negative and significant relationship between product risk and purchasing decision on online shop consumers in Indonesia, that an increase in product risk by consumers would result in a decrease in consumers' willingness to shop online. (Zhang et al. 2011) also referred that according to Chinese consumers who had shopped on B2C websites, product risk negatively effects on their online behavior.

Unlike this attitude, (Qalati et al. 2021; Tham et al. 2019b, 2019a) suggested that product risks have a positive impact on purchase behavior from online businesses, where (Tham et al. 2019b) examined the impact of product risk on online consumer behavior of Malaysian consumers, they indicated that product risk had a significant and positive impact on online shopping behavior. Also, (Tham et al. 2019a) referred that product risk positively effect on online consumer behavior of Malaysian consumers. In addition, (Qalati et al. 2021) reported that Pakistani online shoppers had affected positively by Product risk on purchasing decision in online stores, that an increase in Product risk by consumers while shopping online would increase consumers' propensity to shop online.

However, there are a few research that do not support this relationship, like (Javadi et al. 2012), they referred that product risk not significantly effect on Iranian customers attitudes toward online shopping. Based on the frequencies of rest mentioned in table (1) which pointed out a negative relationship between product risk and online shopping. So that following hypothesis can developed:

H1.2: Product risk has a negative significant impact on consumers' online shopping behavior.

3.1.3. Non-delivery risk and online shopping behavior:

The majority of research that examined the relationship between the non-delivery risk and online shopping behavior concluded that there is a negative impact in this relationship. This finding agreed with the several studies that re-examined the relationship, such as (Gazali and Suyasa 2020; Javadi et al. 2012; Masoud 2013; Tham et al. 2019b, 2019a). where, (Masoud 2013) investigated to what extend non-delivery risk effect on decision-making process during

online shopping in Jordan. The study indicated that non-delivery risk had a negative effect on internet shopping behavior. While (Javadi et al. 2012) that non-delivery risk influenced negatively on people's attitudes regarding online purchase. The findings also revealed that customers' attitudes on online buying influenced positively their online shopping behavior. (Gazali and T. Y. S. Suyasa 2020) also referred to a negative and significant relationship between non-delivery risk and purchase decision on online shop consumers in Indonesia, that an increase in delivery risk by consumers while shopping online would result in a decrease in consumers' willingness to shop online. In addition, (Tham et al. 2019b) examined the impact of non-delivery risk on online consumer behavior of Malaysian consumers, they indicated that non-delivery risk has a significant and negative impact on online shopping behavior. (Tham et al. 2019a) also referred that non-delivery risk negatively effect on online consumer behavior of Malaysian consumers. The literature review suggests a negative relationship between non-delivery risk and online shopping. Based on the previous review, we can develop the following hypothesis:

H1.3: Non-delivery risk has a negative significant impact on consumers' online shopping behavior.

3.1.4. Privacy & security risks and online shopping behavior:

many studies indicated that there are a negative relationship between privacy & security risks and purchasing behavior from electronic stores such as (Almoussa 2014; Crespo et al. 2009; Gazali and Suyasa 2020; Khedmatgozar and Shahnazi 2018; Masoud 2013). where; The Extended E-Commerce Acceptance Model referred by (Crespo et al. 2009) analyzed the impact of privacy risk on e-commerce adoption by end consumers in Spain, they found that intention to shop online is negatively influenced by web-related associated with privacy risk. In addition, (Masoud 2013) investigated to what extend privacy risk effect on decision-making process during online shopping in Jordan. The study indicated that privacy risk had a negative effect on internet shopping behavior. (Khedmatgozar and Shahnazi 2018) also, illustrated that privacy and security risk negatively correlated with clients' intent to adopt with CIB internet banking in Iran, and the Iranian clients' intent to adopt with CIB internet banking decrease with the high level of privacy and security risk. (Almoussa 2014) also, investigated the privacy risk effect on Saudi Arabian consumers' online purchase behavior. The findings indicated that the privacy risk has a significant negative impact on consumers' attitude and intention to shop over the internet. The study's findings also refer that customers' privacy risk reduces consumers' intention to buy online. In addition, Gazali and Suyasa (2020) referred to a negative and

significant relationship between information security risk and purchase variables on online shop consumers in Indonesia. that an increase in information security risk by consumers while shopping online would result in a decrease in consumers' willingness to shop online.

Unlike this attitude, Qalati et al. (2021) reported a positive effect for Privacy risk on purchasing decision making among Pakistani online shoppers. that an increase in Privacy risk by consumers while shopping online would increase consumers' propensity to shop online. Nevertheless, Zhang et al. (2011) pointed out that Privacy risk didn't have a significant effect on online behavior of Chinese consumers who had shopped on B2C websites. The literature review suggests a negative relationship between Privacy and security risk and online shopping. Based on the previous review, we can develop the following hypothesis:

H1.4: Privacy and security risks has a negative significant impact on consumers' online shopping behavior.

3.2.Brand reputation and online shopping behavior:

To avoid fake online stores, many online shoppers seek to find online stores with a good brand reputation. As well as to avoid many of the perceived risks of online shopping. Thus, it is expected that the attitude of customers to buy from online stores will be greater with the good brand reputation. While Dai et al. (2018) referred that sellers' reputation exerted a primary influence on buyers' decision-making in e-commerce in USA. Similarity with Agmeke, Wathoni, and Santoso (2019), while they referred to a positive correlation between brand reputation, purchase intention and actual behavior in e-commerce in Indonesia.

Aside of that Wang et al. (2021) illustrated that brand reputation positively enhance Customers' online shopping behavior in Vietnam, and also Rani and Suradi (2017) pointed out that brand reputation positively affect on behavior intention in Malaysia. In China the same finding Tong (2011) referred to it, and also Sugiharto et al. (2019) illustrated that brand reputation play a positive role in increase customer purchase intention in Jakarta. Based on the previous literature we can develop the 3rd main hypothesis as follow:

H3: brand reputation has a positive significant impact on online shopping behavior.

3.3. The moderation role of brand reputation between perceived risk and online shopping behavior:

Online sellers rely on good brand reputation to mitigate or eliminate the negative impact of perceived risk on a customer's online behavior. The negative relationship between perceived risk and buying behavior from online stores has been studied in several studies such as (Almoussa 2014; Crespo et al. 2009; Gazali and Suyasa 2020; Khedmatgozar and Shahnazi 2018; Masoud 2013; Munikrishnan et al. 2023). However, the researchers' efforts to investigate the moderation role of brand reputation in the relation between perceived risk and customers' online shopping remain few in this field, which is what the objective of this study was based on. So that the 4th main hypothesis will be developed as follow:

H4: Brand reputation significantly moderates the relation between perceived risk and Customers' online shopping behavior.

This hypothesis can be divided in to set of sub hypotheses:

H4.1: Brand reputation significantly moderates the relation between financial risk and customers' online shopping behavior.

H4.2: Brand reputation significantly moderates the relation between product risk and Customers' online shopping behavior.

H4.3: Brand reputation significantly moderates the relation between non-deliver risk and Customers' online shopping behavior.

H4.4: Brand reputation significantly moderates the relation between privacy & security risk and Customers' online shopping behavior.

4. Research problem

The theory of perceived risk posits that the negative perception of risk associated with purchasing influences customers' attitudes and intentions towards buying (Cox and Rich 1964). Various dimensions of perceived risk, such as financial risk, product risk, non-delivery risk, and privacy and security risk, have been found to lead to a negative attitude towards online shopping behavior (Almoussa 2014; Ariff et al. 2014; Bhatti and Rehman 2019; Crespo et al. 2009; Gazali and Suyasa 2020; Javadi et al. 2012; Khedmatgozar and Shahnazi 2018; Masoud 2013; Munikrishnan et al. 2023; Poon 2007; Qalati et al. 2021; Tham et al. 2019a; Zhang, Lu, and Kizildag 2018). Conversely, numerous studies have highlighted a positive relationship between a brand's good reputation

and customers' intention, attitudes, and actual purchase behavior online (Agmeka et al. 2019; Dai et al. 2018; Rani and Suradi 2017; Sugiharto et al. 2019; Tong 2011; Wang et al. 2021). Despite this, there has been little attention paid in the literature on investigating the extent to which brand reputation moderates the relationship between perceived risk and online shopping behavior. Therefore, the research problem can be summarized through the following questions:

1. To what extent does brand reputation significantly moderate the relationship between perceived risk and online shopping behavior?

Subsequently, the main question leads to the following sub-questions:

1.1. To what extent does perceived risk affect online shopping behavior?

1.2. To what extent does brand reputation affect online shopping behavior?

1.3. To what extent does brand reputation significantly moderate the relationship between perceived risk and online shopping behavior?

5. Research objectives

The current study aims to investigate whether the moderation of good brand reputation will reduce the perceived risks of the customer, and the effect of both variables (perceived risks and brand reputation) on the purchase behavior of online stores. So that the research objectives can be illustrated as follow:

Investigating the moderation role of brand reputation in the relation between perceived risk and online shopping behavior.

based on the main objective, the sub- objectives can be developed as follow:

Investigating the perceived risk affection on online shopping behavior?

Investigating the perceived risk affection on brand reputation for online stores?

Investigating the reputation affection on online shopping behavior?

Investigating the moderation role of brand reputation in the relation between perceived risk and online shopping behavior

6. Research importance:

The study holds significance from both theoretical and practical perspectives:

Theoretical importance: The research contributes to understand the perceived risk model by highlighting the role of brand reputation. By introducing a model where brand

reputation acts as a moderator between perceived risk and online shopping behavior, the research advances our understanding of consumer decision-making processes in digital stores, this contributions sheds light on the consumer decision-making processes in online contexts.

Practical importance: The findings of the study offer valuable insights for managers aiming to comprehend and navigate online customer behavior effectively. Moreover, the study presents a practical model that can aid managers in devising strategies to enhance online sales. The accompanying set of recommendations provides actionable guidance for businesses seeking to leverage brand reputation to mitigate perceived risks and drive online purchasing behavior. Ultimately, this contributes to the development of pragmatic approaches for optimizing online retail operations.

7. Methodology:

7.1. Research model:

Research model developed based on the theory perceived risk and the research problem, which was reflected in the limitations of the studies dealing with the moderating of the brand's reputation with the dimensions of the perceived risk. Based on the foregoing, the study model can be written as follows:

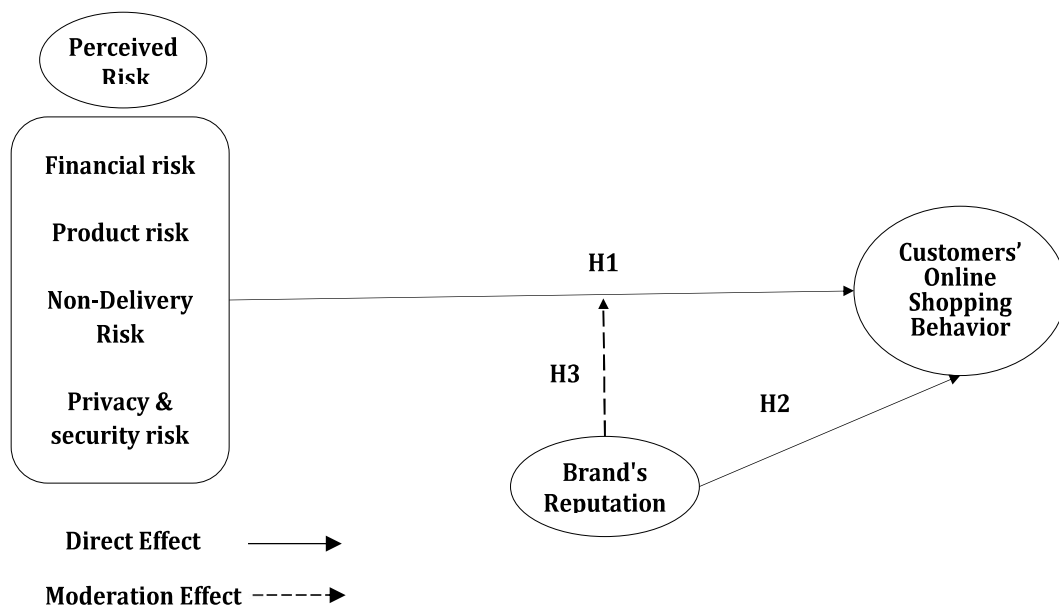


Figure 3. The research model

7.2. Measurements:

We used (Crespo et al. 2009; Forsythe and Shi 2003; Masoud 2013; Tham et al. 2019; Tran 2020) to measure the dimensions of perceived risk, and (Chen and Barnes 2007; Doney and Cannon 1997; Jarvenpaa, Tractinsky, and Vitale 2000) to measure the items of brand reputation. While online shopping behavior was measured based on (Hussein, Mubarak, and Rayan 2022; Masoud 2013). Each variable was assessed using a five-point Likert scale ranging from strongly agree (5 points) to strongly disagree (1 degree). Scale items for each variable illustrated in Appendix A.

7.3. Research method:

This research follows the analytical descriptive method, as it is considered as a quantitative research, because all variables will be quantitatively measured through the questionnaire. Also, testing the hypotheses of the study requires analyzing the relationship between a group of variables, in addition to the need to test the validity and reliability of the questionnaire, so this research is considered descriptive and analytical.

7.4. Sample and procedure:

The population is presented in online shoppers who shop from e-stores in Egypt such as Jumia, Amazon, and Noon. Data was collected through an online questionnaire in the period between March and June 2023. Due to the unavailability of a framework for the community, the convenience sample is best suited to the nature of this research (Saunders, Lewis, and Thornhill 2023). Due to the SEM analysis, large sample is preferred, and sample size reached to 474 shoppers.

The study population represented on online shoppers in Egypt frequenting e-commerce stores such as Jumia, Amazon, and Noon. Data was gathered through an online questionnaire spanning the period between March and June 2023. Due to the unavailability of a framework for the community, the convenience sample is best suited to the nature of this research (Saunders, Lewis, and Thornhill 2023). Recognizing the structural equation modeling (SEM) analysis, large sample size was preferred, which reached to 474 shoppers.

8. Data Analysis and Results

In the following, we examined the validity and reliability of the questionnaire, and verified the confirmatory factor validity of the study model. The descriptive analysis was extracted, then the study hypotheses were tested through the structural equation modeling (SEM) method. SPSS V.22 and the AMOS V.22 statistical analysis program were used.

8.1. Reliability and Validity

Principal component analysis method were used to extract the factorial analysis matrix, which it conducted on (474) online customers as a pre-test to validate the measures of the variables. The results of the matrix can be clarified in the following table No. (2):

Table 2: Exploratory factor analysis matrix (EFA)

Variables	Statements	Exploratory factor analysis matrix (EFA)					
		FR	PR	NDR	PSR	Rep	OS
Financial risk (FR)	FR1	0.931					
	FR2	0.933					
	FR3	0.933					
Product risk (PR)	PR1	0.908					
	PR2	0.948					
	PR3	0.932					
	PR4	0.945					
Non-delivery risk (NDR)	NDR1	0.902					
	NDR2	0.836					
	NDR3	0.919					
	NDR4	0.877					
Privacy and security risk (PSR)	PSR1	0.927					
	PSR2.	0.946					
	PSR3	0.955					
	PSR4	0.917					
Brand reputation (Rep)	Rep1	0.891					
	Rep2	0.946					
	Rep3	0.912					
	Rep4	0.844					
Online shopping behavior (OS)	OS1	0.847					
	OS2	0.926					
	OS3	0.866					
	OS4	0.860					
Cronbach's alpha		0.90	0.92	0.95	0.91	0.95	0.95
KMO Test		0.71	0.85	0.73	0.84	0.70	0.72
Total Variance Explained		75.76	86.35	80.78	84.23	84.81	73.72

Source: SPSS statistical analysis

EFA coefficient ≥ 0.4 and Cronbach's alpha value ≥ 0.70 can be accepted (Hair et al. 2019). The matrix results illustrated that all EFA's statements are ≥ 0.84 , and Cronbach's alpha is ≥ 0.90 for all contracts. So, it can be indicated that an adequate value of reliability is available.

8.2. Normality:

The "Critical Ratio" is a useful tool for determining if the data follows a normal distribution. It is calculated based on the kurtosis and skewness coefficients for individual expressions, as well as the Mardia's coefficient for the multiple normal distribution of the model as a whole. The acceptable critical values for these coefficients fall within the range of -1.96 to 1.96 at a confidence level of 95% (Stevens, 2012).

Table 3: the variate and multivariate normal distribution

Variable	skew	c.r.	kurtosis	c.r.	Normality graphs	Follow normal distribution
Online Shopping	-1.616	-12.501	1.698	6.568		No
Brand Reputation	-1.626	-12.576	1.978	7.651		No
Financial risk	0.782	6.049	-0.313	-1.211		No
Product risk	0.799	6.183	-0.575	-2.224		No
Privacy and security risk	0.696	5.386	-0.378	-1.462		No
Non-delivery risk	1.165	9.012	0.518	2.004		No

Continued →



Source: Results of statistical analysis by Amos and Data-Tab

From the previous table, we notice that the critical ratio (c.r.) value ranged from (-12.576) to (9.012) for both the kurtosis and skewness. We note that the critical ratio was not met the acceptable level for normality (i.e. -1.96 to 1.96) in any of the variables shown in the table. Therefore, it can be noted that the variables do not achieve a normal distribution at the individual level. For a multivariate normal distribution, we also note that the critical ratio (c.r.) for the Marida test does not achieve a normal distribution. As for data distribution graphs, the result suggests that the data not follow a typical bell-shaped curve and have a non-normal distribution.

Since the assumption of normal distribution is not available at the individual level or at the multiple level of the data, the model estimation will be completed via the Amos program using the Bootstrapping Technique, which is used as an alternative to parametric estimates in statistical analysis (Stevens, 2012).

8.3.Descriptive analysis:

The study variables' frequencies, means and standard deviations can be used to describe the study data, and this can be explained as follows:

Table 4: descriptive analysis

Variables		Mean	Std. Deviation
Independent variables	Financial risk (FR)	1.69	0.87
	Product risk (PR)	2.30	1.11
	Non-delivery risk (NDR)	2.20	0.98
	Privacy and security risk (PSR)	2.25	1.17
Moderator	Brand reputation (Rep)	4.14	0.88
Dependent variable	Online shopping behavior (OS)	4.12	0.82

Source: SPSS statistical analysis

Regarding perceived risk; The variable (Product risk) comes with the highest mean (2.30) and a standard deviation (1.11), followed by the variable (Privacy and security risk) with a mean of (2.25) and a standard deviation (1.17), and then the variable (Non-delivery risk) with a mean of (2.20) and a standard deviation (0.98), and in the last test among the independent variables, the variable (Financial risk) comes with a mean of (1.69) and a standard deviation (0.87).

Whereas the moderator variable, Brand reputation comes with a mean of (4.14) and standard deviation (0.88). The dependent variable, Online shopping behavior comes with a mean of (4.12) and standard deviation (0.82).

8.4. Confirmatory factor analysis

Confirmatory factor analysis (CFA) describes how closely related each variable's statements are to one another. If the standardized loading estimates (SLE) are ≥ 0.5 , scale statements are acceptable (Hair et al. 2019). We guided by the following recommended values for evaluating the model's goodness of fit:

Table 6: Recommended values for goodness of fit

Indicator	Recommended values	Reference
(χ^2/df)	$\chi^2/df < 5$ acceptable fit; $\chi^2/df < 3$ good fit	(Awang 2012; Gheshlagh et al. 2018)
P-value of Chi-Square	A level of significance ≥ 0.05 can be accepted if the sample size is greater than 200 items	(Awang 2012; Gheshlagh et al. 2018; Schumacker and Lomax 2004; Thakkar 2020)
RMSEA	RMSEA > 0.08 poor fit; RMSEA (0.05 to 0.08) good fit; RMSEA (0 to 0.05) perfect fit	(Awang 2012; Gheshlagh et al. 2018; Thakkar 2020)
CFI	≥ 0.90 good fit	(Awang 2012; Hu and Bentler 1999; Schumacker and Lomax 2004; Thakkar 2020)
GFI	≥ 0.90 good fit; ≥ 0.80 acceptable fit	(Awang 2012; Schumacker and Lomax 2004)
AGFI	≥ 0.80 good fit	(Abedi, Rostami, and Nadi 2015; Gheshlagh et al. 2018; Schumacker and Lomax 2004; Thakkar 2020)
NFI	≥ 0.90 good fit; ≥ 0.80 acceptable fit	(Abedi et al. 2015; Awang 2012; Thakkar 2020)
TLI	≥ 0.90 good fit	(Awang 2012)

Source: adopted from referances mentioned in the table.

The following figure (4) shows the confirmatory factor analysis of the study variables, and it illustrate the extent to which each statement is close to their variable :

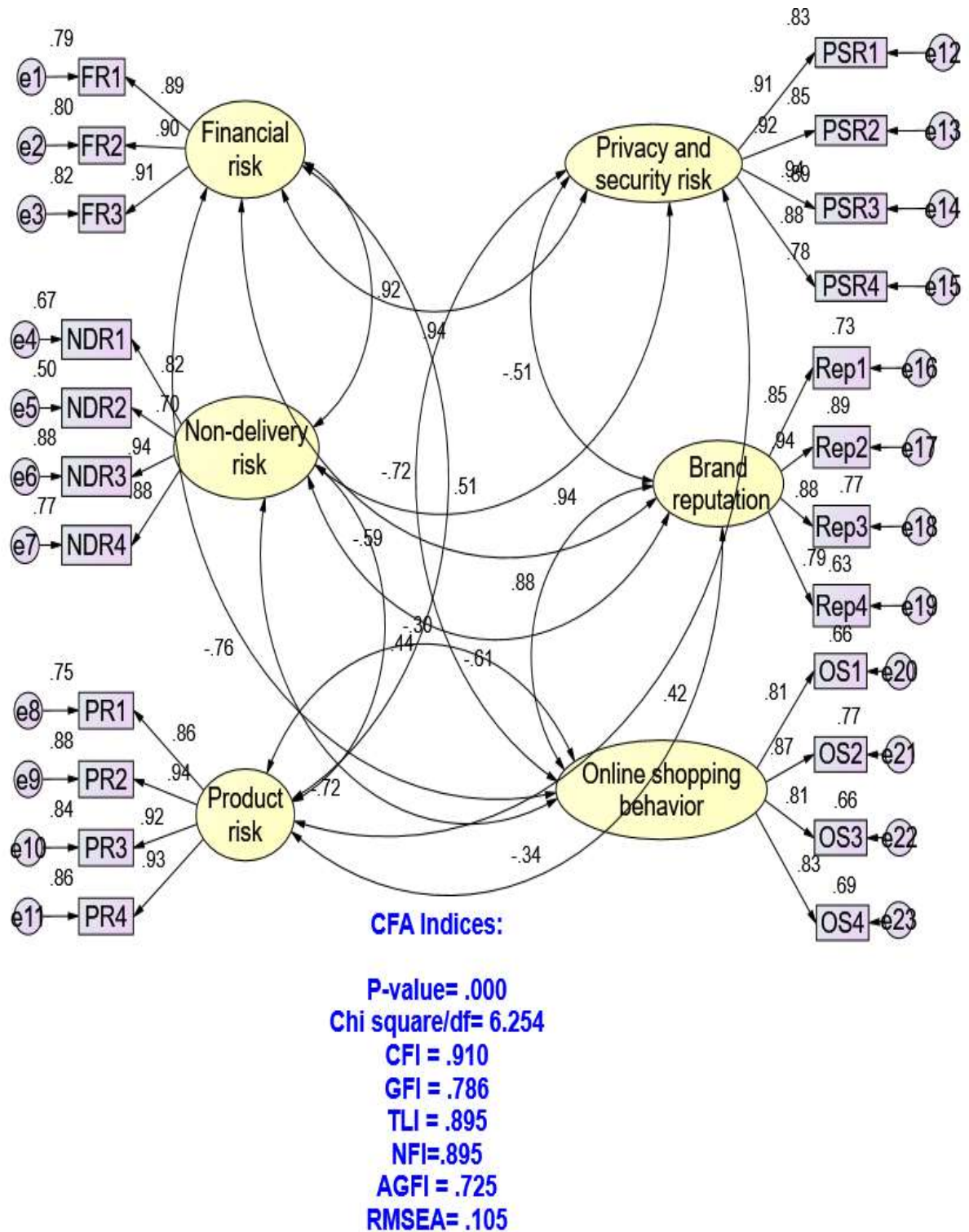


Figure 4: Confirmatory Factor Analysis

Source: Results of statistical analysis by Amos

The following table (6) shows the standardized estimate for factor loadings for latent variables during confirmatory factor analysis:

Table 7: factor loadings for confirmatory factor analysis:

Paths			Standardized Estimate	Estimate	S.E.	C.R.	P
OS4	<---	OS.	0.832	0.998	0.047	21.337	***
OS3	<---	OS.	0.811	0.877	0.043	20.57	***
OS2	<---	OS.	0.875	1.049	0.046	22.982	***
OS1	<---	OS.	0.813	1			
FR3	<---	FR.	0.905	1			
FR2	<---	FR.	0.897	1.039	0.034	30.71	***
FR1	<---	FR.	0.888	1.007	0.034	29.93	***
PSR4	<---	PSR.	0.885	1.121	0.036	30.822	***
PSR3	<---	PSR.	0.943	1.102	0.03	37.203	***
PSR2	<---	PSR.	0.921	1.06	0.031	34.494	***
PSR1	<---	PSR.	0.913	1			
NDR4	<---	NDR.	0.877	0.916	0.029	31.413	***
NDR3	<---	NDR.	0.936	1			
NDR2	<---	NDR.	0.704	0.623	0.032	19.633	***
NDR1	<---	NDR.	0.816	0.744	0.028	26.182	***
Rep4	<---	BR.	0.795	0.87	0.04	21.513	***
Rep3	<---	BR.	0.878	0.935	0.036	25.619	***
Rep2	<---	BR.	0.941	1.112	0.038	29.152	***
Rep1	<---	BR.	0.854	1			
PR4	<---	PR.	0.925	1			
PR3	<---	PR.	0.915	0.84	0.024	34.577	***
PR2	<---	PR.	0.938	0.943	0.025	37.207	***
PR1	<---	PR.	0.864	0.708	0.024	29.441	***

Source: Results of statistical analysis by Amos

Through the previous table, it can be seen that the standardized estimate (S.E) for factor loadings of Financial risk (FR) ranged from (0.888 to 0.905), while it ranged from (0.864 to 0.938) for Product risk (PR) , also it ranged from (0.816 to 0.936) belonging to Non-delivery risk (NDR), as well it ranged from (0.885 to 0.943) belonging to Privacy and security risk (PSR), while Brand reputation (Rep) ranged from (0.795 to 0.941), finally Online shopping behavior (OS) ranged from (0.811 to 0.875). The scale's standardized estimates considered acceptable if the Standardized loading estimates ≥ 0.5 (Hair et al. 2019). So that it can be indicated that an adequate value of standardized estimates are available for all items.

Belonging to the CFA's goodness of fit, the fit statistics are grouped into: absolute fit, incremental fit, and parsimonious fit statistics. P-value of χ^2 , RMSEA and GFI are examples of the absolute fit statistics. Whereas AGFI, CFI, TLI, and NFI are examples of incremental fit

statistics. The ratio (χ^2/df) is considered as parsimonious fit statistic (Hair et al. 2019). The main indicators estimates can be illustrated as follow:

Table 8: CFA’s goodness of fit estimates

Indicator	Measured value	Fit level
<i>(χ^2/df)</i>	6.254	Poor fit
P-value of Chi-Square	0.000	Acceptable fit
RMSEA	0.105	Poor fit
CFI	.0910	Good fit
GFI	0.786	Poor fit
AGFI	0.781	Poor fit
NFI	0.895	Poor fit
TLI	0.895	Poor fit

Source: Results of statistical analysis by Amos

Concerning to the CFA’ absolute fit statistics: P-value of χ^2 had acceptable fit with $p < 0.05$, RMSEA had a poor fit with **0.105** (i.e. < 0.08), and GFI had poor fit with **0.786** (i.e. < 0.9). Concerning to the incremental fit statistics: AGFI had a poor fit with **0.781** (i.e. > 0.80), CFI had a good fit with **0.955** (i.e. > 0.90), TLI had a poor fit with **0.895** (i.e. > 0.90), and NFI had a poor fit with **0.895** (i.e. > 0.90). Concerning to the parsimonious fit statistic: the ratio (χ^2/df) had poor fit with **6.254** (i.e. < 3).

Based on CFA’ fit statistics, the model had an acceptable incremental and parsimonious fit, Otherwise the absolute fit needs some refinements, in order to increase model fit. Following table illustrate the modification indices:

Table 9: Possible modifications in the model.

Variable	Covariance		M.I.	Refinement way
NDR	e5	<-->	e4	77.303
PSR	e12	<-->	e15	13.296
	e13	<-->	e14	6.483
OS	e20	<-->	e22	21.38
	e20	<-->	e21	4.458

Source: Results of statistical analysis by Amos

CFA model refinement will be through covariation of the latent variables of “e5 & e4; e12 & e15; e13 & e14 ; e20 & e22; and e20 & e21”. CFA after refinement can be clarified in the following figure (8):

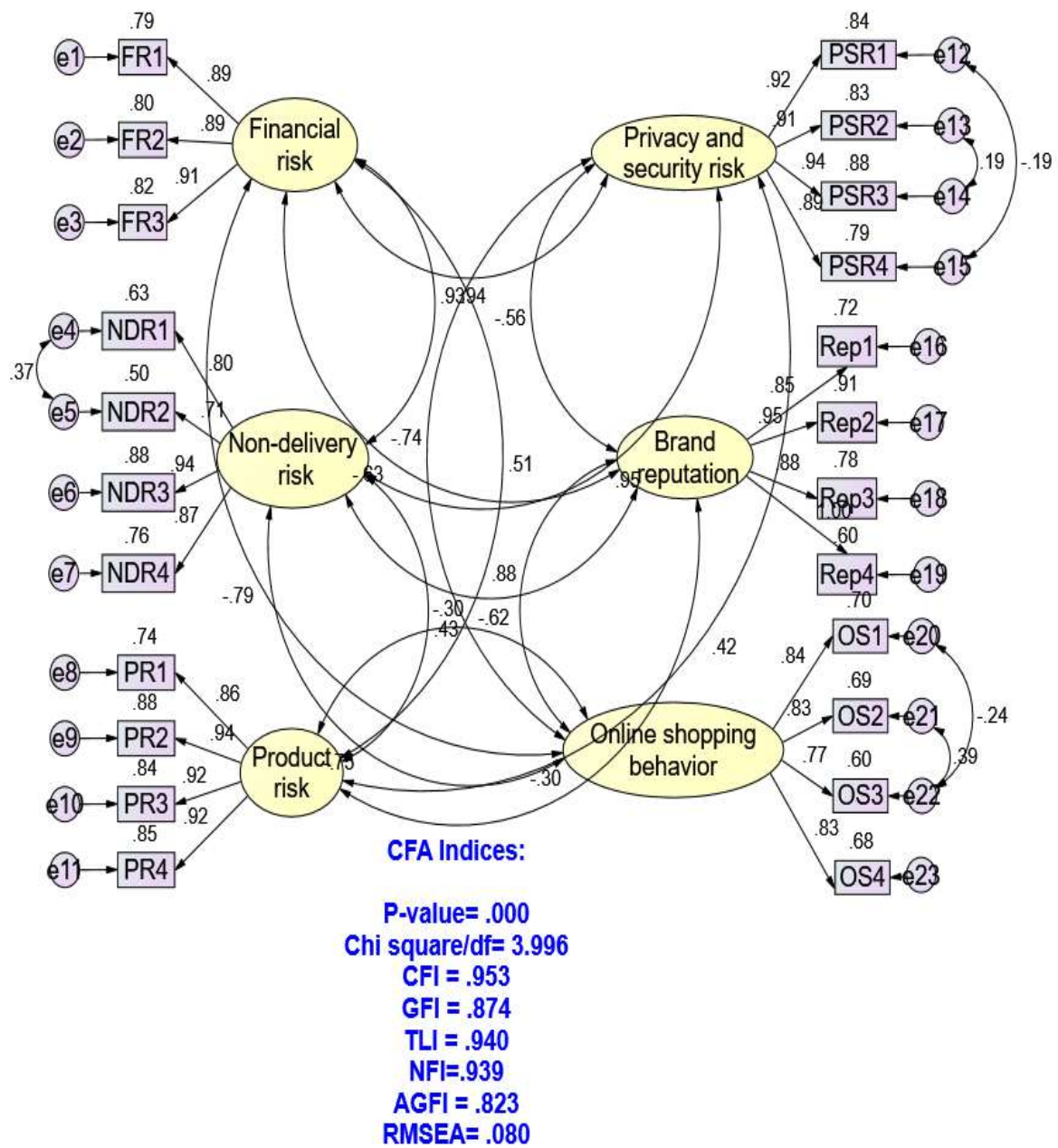


Figure 5: Confirmatory Factor Analysis after refinements

The following table (7) shows the standardized estimate for factor loadings for latent variables during confirmatory factor analysis after refinements:

Table 10 : confirmatory factor analysis after refinements

Paths	Standardized Estimate	Estimate	S.E.	C.R.	P
OS4 <--- OS.	0.827	0.965	0.043	22.264	***
OS3 <--- OS.	0.774	0.806	0.044	18.161	***
OS2 <--- OS.	0.831	0.958	0.043	22.481	***
OS1 <--- OS.	0.839	1			
FR3 <--- FR.	0.908	1			
FR2 <--- FR.	0.894	1.033	0.034	30.76	***
FR1 <--- FR.	0.887	1.003	0.033	30.134	***
PSR4 <--- PSR.	0.886	1.099	0.038	29.108	***
PSR3 <--- PSR.	0.936	1.09	0.03	36.476	***
PSR2 <--- PSR.	0.912	1.046	0.031	33.596	***
PSR1 <--- PSR.	0.919	1			
NDR4 <--- NDR.	0.874	0.908	0.029	31.352	***
NDR3 <--- NDR.	0.939	1			
NDR2 <--- NDR.	0.71	0.625	0.031	20.488	***
NDR1 <--- NDR.	0.796	0.724	0.029	24.928	***
Rep4 <--- BR.	1.003	1.131	0.053	21.215	***
Rep3 <--- BR.	0.883	0.945	0.037	25.742	***
Rep2 <--- BR.	0.952	1.134	0.038	29.467	***
Rep1 <--- BR.	0.851	1			
PR4 <--- PR.	0.923	1			
PR3 <--- PR.	0.916	0.851	0.025	34.716	***
PR2 <--- PR.	0.94	0.959	0.025	38.158	***
PR1 <--- PR.	0.862	0.715	0.024	29.344	***

Source: Results of statistical analysis by Amos

Through the previous table, it can be seen that the standardized estimate (S.E) for factor loadings of Financial risk (FR) ranged from (0.894 to 0.908), while it ranged from (0.862 to 0.94) for Product risk (PR) , also it ranged from (0.800 to 0.940) belonging to Non-delivery risk (NDR), as well it ranged from (0.886 to 0.936) belonging to Privacy and security risk (PSR), while Brand reputation (Rep) ranged from (0.883 to 1.003), finally Online shopping behavior (OS) ranged from (0.774 to 0.839). The scale’s standardized estimates considered acceptable if the standardized loading estimates ≥ 0.5 (Hair et al. 2019). So that it can be indicated that an adequate value of standardized estimates is available for all items. The main indicators estimate after CFA refinements can be illustrated as follow:

Table 11: CFA fit indicators after refinements

Indicator	Measured value	Fit level
(χ^2/df)	3.996	Good fit
P-value of Chi-Square	0.000	Acceptable fit
RMSEA	0.080	Good fit
CFI	0.953	Good fit
GFI	0.874	Acceptable fit
AGFI	0.823	Good fit
NFI	0.959	Good fit
TLI	0.940	Good fit

Source: Results of statistical analysis by Amos

Concerning to the CFA' absolute fit statistics: P-value of χ^2 had acceptable fit with $p < 0.05$, RMSEA had a good fit with 0.080 (i.e. < 0.08), and GFI had an acceptable fit with 0.874 (i.e. < 0.9). Concerning to the incremental fit statistics: AGFI had a good fit with 0.823 (i.e. > 0.80), CFI had a good fit with 0.953 (i.e. > 0.90), TLI had a good fit with 0.940 (i.e. > 0.90), and NFI had a good fit with 0.923 (i.e. > 0.90). Concerning to the parsimonious fit statistic: the ratio (χ^2/df) had an acceptable fit with .3996 (i.e. < 3). Based on CFA' fit statistics, the model had an acceptable fit. Which can be relied upon in conducting structural equation modeling (SEM).

8.5. Structural equation modeling (SEM)

Structural equation modeling (SEM) is a multivariate analysis that seeks to evaluate the effect of a group of variables on one or more dependent variables at the same time (Hair et al. 2019).

Due to conduct moderation analysis, three steps must be fulfilled (Baron and Kenny 1986):

Step 1: a significant effect of the independent variable (Perceived risk) on the dependent variable (Online shopping behavior).

Step 2: a significant effect of the moderator variable (Brand reputation) on the dependent variable (Online shopping behavior).

Step 3: When the moderator variable (Brand reputation) enters the regression equation, the effect of the independent variable is either removed (total interference moderation) or changed (partial interference moderation).

So that, hypotheses will be going on test Perceived risk on Online shopping behavior first before "Brand Reputation" entrance as a moderator variable, second SEM after the moderation role of "Brand Reputation".

Figure (6) shows the results of SEM for hypotheses as follow:

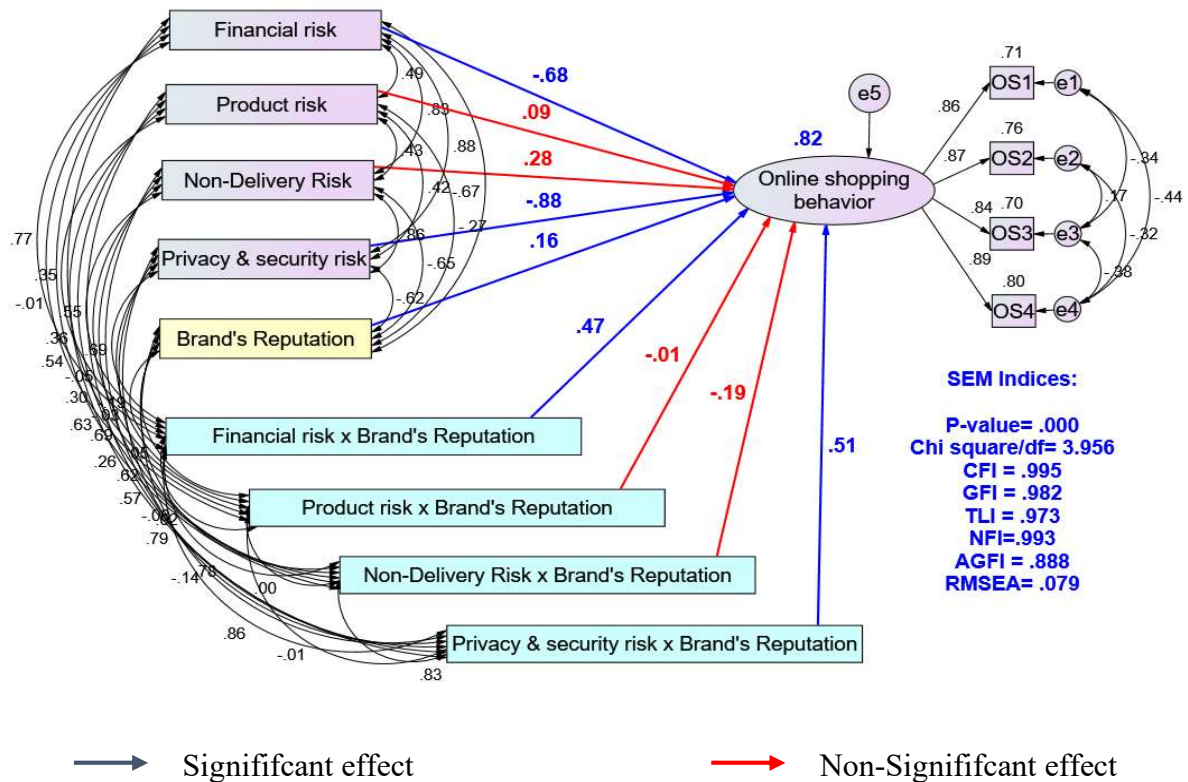


Figure 6: the result of SEM testing

The main indicators estimate for SEM can be illustrated as follow:

Table 12: SEM fit indicators

Indicator	Measured value	Fit level
(χ^2/df)	3.965	Good fit
P-value of Chi-Square	0.000	Acceptable fit
RMSEA	0.079	Good fit
CFI	0.995	Good fit
GFI	0.982	Good fit
AGFI	0.888	Good fit
NFI	0.993	Good fit
TLI	0.973	Good fit

Source: Results of statistical analysis by Amos

Concerning to the SEM absolute fit statistics: P-value of χ^2 had acceptable fit with $p < 0.05$, RMSEA had a good fit with 0.079 (i.e. < 0.08), and GFI had good fit with 0.982 (i.e. > 0.9). Concerning to the incremental fit statistics: AGFI had a good fit with 0.888 (i.e. > 0.80), CFI had a good fit with 0.995 (i.e. > 0.90), TLI had a good fit with 0.973 (i.e. > 0.90), and NFI had

a good fit with 0.993 (i.e. > 0.90). Concerning to the parsimonious fit statistic: the ratio (χ^2/df) had an acceptable fit with 3.965 (i.e. < 3). Based on SEM fit statistics, the model had an acceptable fit. Which can be relied upon in hypotheses testing:

8.5.1. Testing hypotheses one:

The first hypothesis aims to test the effect of perceived risks on electronic shopping behavior. Which it assumed that:

Table 13: result of hypotheses one

	Path	Standardized Estimate	Estimate	P	Result
H1.1	Financial risk → Online shopping behavior	-.68	-.170	.007	Supported
H1.2	Product risk → Online shopping behavior	.09	.007	.120	Not supported
H1.3	Non-deliver risk → Online shopping behavior	.28	.040	.125	Not supported
H1.4	Privacy & security risk → Online shopping behavior	-.88	.044	***	Supported

Source: Results of statistical analysis by Amos

As can be shown in table (13), Financial risk → Online shopping behavior ($\beta = -0.86$, $P = 0.007$), and Privacy & security risk → Online shopping behavior ($\beta = -0.88$, $P = 0.000$), so that H1.1 and H1.4 paths were supported. While Product risk → Online shopping behavior ($\beta = 0.13$, $P = 0.289$), and Non-deliver risk → Online shopping behavior ($\beta = 0.23$, $P = 0.204$), so that H1.2 and H1.3 paths were not supported.

Based on the previous finding, H1 can be partially accepted that perceived risk dimensions (Financial risk and Privacy & security risk) negatively affect on online shopping behavior.

8.5.2. Testing hypotheses two:

The 2nd hypothesis aims to test the effect of brand reputation on online shopping, which it assumed that:

H2: brand reputation has a positive significant impact on online shopping behavior.

Table 15: result of SEM of hypothesis two and three

	Path	Standardized Estimate	Estimate	P	Result
H2	Brand reputation → Online shopping behavior	.16	.157	.024	Supported

Source: Results of statistical analysis by Amos

As can be shown in table (15), **Brand reputation \rightarrow Online shopping behavior** ($\beta = .16$, $P = 0.024$), so that H2 was supported. Based on the previous finding, H2 can be accepted that brand reputation positively affect on online shopping behavior

8.5.3. Testing hypotheses three:

The 3rd hypothesis aims to test the moderation role of brand reputation in the relation between perceived risk and customers' online shopping behavior, which it assumed that:

H3: Brand reputation significantly moderates the relation between perceived risk and Customers' online shopping behavior.

This hypothesis can be divided in to set of sub hypotheses:

H3.1: Brand reputation significantly moderates the relation between financial risk and customers' online shopping behavior.

H3.2: Brand reputation significantly moderates the relation between product risk and Customers' online shopping behavior.

H3.3: Brand reputation significantly moderates the relation between non-deliver risk and Customers' online shopping behavior.

H3.4: Brand reputation significantly moderates the relation between privacy & security risk and Customers' online shopping behavior.

The following table illustrates the result of hypothesis three:

Table 17: result of SEM og hypothesis four

	Path	Standardized Estimate	Estimate	P	Result
H3.1	FR x Rep \rightarrow OS	.467	.008	.036	Supported
H3.2	PR x Rep \rightarrow OS	-.188	-.003	.247	Not supported
H3.3	NDR x Rep \rightarrow OS	-.014	.000	.570	Not supported
H3.4	PSR x Rep \rightarrow OS	.509	.007	.021	Supported

Source: Results of statistical analysis by Amos

As can be shown in table (19), FR x Rep \rightarrow OS ($\beta = .467$, $P = 0.036$), and PSR x Rep \rightarrow OS ($\beta = 0.509$, $P = 0.021$), so that H3.1 and H3.4 were supported. While H2.3 and H3.3 paths (PR x Rep \rightarrow OS) and (NDR x Rep \rightarrow OS) were not supported. It can be clarified that the role of the moderator variable (brand reputation) in the relationship between financial risk and online shopping convert the negative effect from ($\beta = -.679$) into a positive effect with a value of ($\beta = .467$). and also, the role of the moderator variable (brand reputation) in the relationship between privacy & security risk and online shopping convert the negative effect from ($\beta = -.879$) into a positive effect with a value of ($\beta = .509$). Based on the previous finding, H3 can be accepted partially that brand reputation plays a moderator role between percived risk

dimensions (financial risk and privacy & security risk) and online shopping behavior . Based on the hypotheses testing, we can summarize the study result in the following figure:

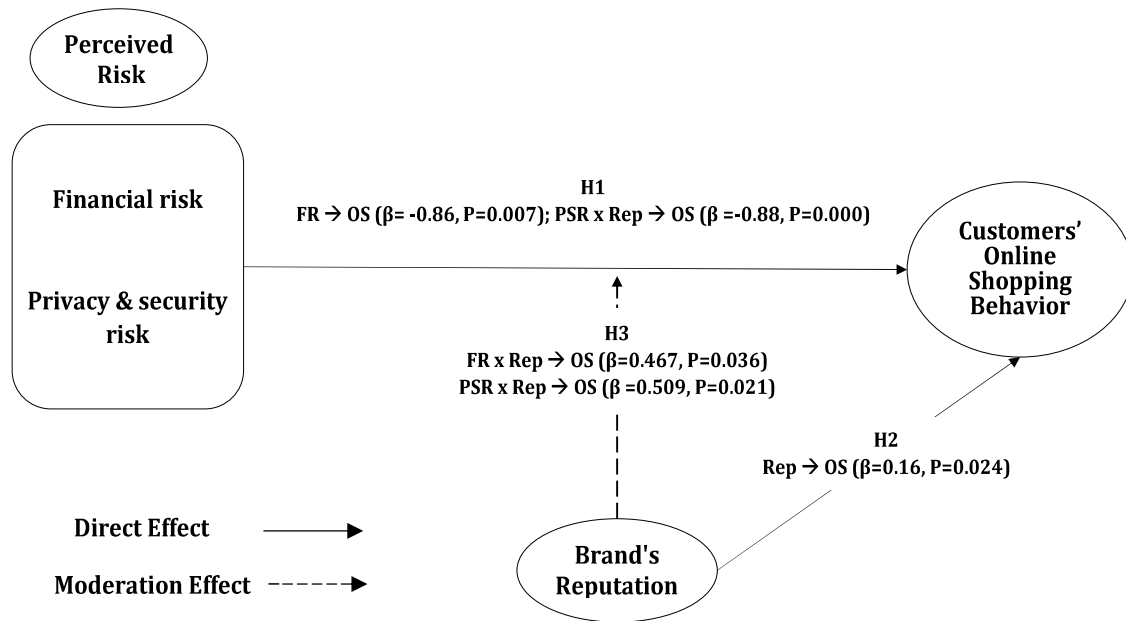


Figure 9. The model testing result

9. Discussion:

The purpose of this study was to determine whether brand reputation plays a moderation role in the relationship between perceived risk and online shopping behavior. To achieve this goal, we first reviewed studies that showed the relationship between perceived risk and online shopping behavior, as well as studies that showed the relationship between brand reputation and online shopping behavior. The research gap was represented by a lack of literature that dealt with the extent of the role of the reputation of the brand of electronic stores in changing the negative impact of perceived risks on electronic shopping behavior. The research's problems, model and hypotheses were developed. The study was applied on Egyptian online stores such as (Amazon, Olx, Jumia, Noon, and etc.). Data was collected from 474 customers. Statistical analysis relied on the SPSS V 22 and AMOS V 22 program.

The first hypothesis (H1) aimed to determine whether there is a significant and negative effect of perceived risks on online shopping behavior for Egyptian customers. The findings indicated that the hypothesis was partially accepted, as perceived risks (financial risks and privacy & security risks) had a negative impact on online shopping behavior, whereas product risks and non-delivery risks had no significant effect on online shopping behavior, which can be explained as follows:

The first sub-hypothesis (H1.1) result indicated that financial risk has a negative significant impact on consumers' online shopping behavior. This result is consistent with (Almoussa 2014; Crespo et al. 2009; Gazali and Suyasa 2020; Javadi et al. 2012; Khedmatgozar and Shahnazi 2018; Masoud 2013) but differs from (Qalati et al. 2021; Tham et al. 2019b) in the affect direction. This finding explains that customers' attitudes toward online shopping decrease as their concern about incurring additional fees or losing money increases. Consumers become more cautious and hesitant to make online purchases when they perceive a higher financial risk. They may opt for alternative payment methods or choose to shop from trusted and well-established online retailers to mitigate the potential risks associated with online shopping.

The second sub-hypothesis (H1.2) result indicated that the product risk didn't have a significant impact on consumers' online shopping behavior. Therefore, product risk cannot be relied upon to judge the customer's decision to accept online shopping. This result is agreed with (Javadi et al. 2012) Unlike this attitude, (Gazali and Suyasa 2020; Masoud 2013; Qalati et al. 2021; Tham et al. 2019a, 2019b; Zhang et al. 2011), They explained that product risk contributes to predicting the customer's decision to accept online shopping.

The fourth sub-hypothesis (H1.4) result indicated that privacy & security has a negative significant impact on consumers' online shopping behavior. This finding agreed with as (Almoussa 2014; Crespo et al. 2009; Gazali and Suyasa 2020; Khedmatgozar and Shahnazi 2018; Masoud 2013). This finding explains that privacy and security risks can be relied upon to judge the customer's decision to accept online shopping.

These findings agreed with the Decision Theory and Perceived Risk Theory, the overall risk has a negative impact on the customer's decision-making attitude, and customers are less likely to make a purchase decision when they are uncertain about the outcome of the purchase.

The second hypothesis (H2) seeks to investigate to what extent brand reputation positively effect on online shopping behavior in Egypt. The findings indicated that the third hypothesis was accepted, as the reputation of online store brands positively influences on online shopping behavior in Egypt. This finding explains that customers who have a positive shopping experience from a specific brand are more likely to shop online from the same brand. These findings agreed with the Theory of planned behavior and (Agmeka et al. 2019; Dai et al. 2018; Rani and Suradi 2017; Sugiharto et al. 2019; Tong 2011; Wang et al. 2021), whereas the good brand reputation make customer feel confident to online shopping.

The third hypothesis (H3) seeks to investigate to what extent the "brand reputation" play a moderator role in the relationship between perceived risk and customers' behavior toward shopping from online stores. The findings suggested that the fourth main hypothesis was

partially accepted, as the "brand reputation" variable plays a significant role as a moderator in the relationship between perceived risk dimensions (financial risks and privacy & security risks) and online shopping behavior. which can be explained as follows:

The first sub-hypothesis (H3.1) result indicated that brand reputation significantly moderates the relation between financial risk and customers' online shopping behavior. This finding explains that brand reputation plays a role in reducing the concern about incurring additional fees or losing money, and increase the customer willing to shop online.

The third sub-hypothesis (H3.4) result indicated that brand reputation significantly moderates the relation between privacy & security risk and Customers' online shopping behavior. This finding explains that brand reputation plays a role in reducing the concern about privacy & security risk associated with online purchasing, and increase the customer willing to shop online.

These findings agreed with the Theory of planned behavior, Equity Theory, Perceived Benefits Theory, The Unified Theory of Acceptance and Use Of Technology (UTAUT) (Ajzen 1991; Hussein et al. 2022; Venkatesh et al. 2003), Whereas consumers are more likely to shop online for products/services that have a low purchasing risk and well-known brands.

10. Conclusions

After discussing the study's findings, the researcher comes to a set of conclusions based on the findings, which can be summarized as follows:

It has been determined that financial risks and privacy & security risks have a direct negative significant effect on the behavior of online shopping from online stores, and we conclude as follows: Customer behavior in financial aspects tends to be rational, whereas customer before acting to carry out a certain behavior. He assesses the level of anticipated financial risks. When looking to buy, customers compare technological and other traditional methods. As a result, if there is a high level of anxiety associated with the possibility of charging the customer excessive expenses, the customer's intention and direction to buy from electronic stores. In terms of privacy & security risks, the customer believes that the e-purchase process may lose privacy and his private data will be available to others. As a result, the customer is concerned about making a purchase decision from e-stores.

Financial risks and privacy & security risks have a direct negative significant impact on the brand's reputation, and we conclude: The high financial risks associated with an online store have a negative impact on the brand's reputation, especially in the field of electronic commerce.

Customers base their purchasing decisions on the reviews of other customers, which is referred to as the social impact on adapting to the use of technology (Hussein et al. 2022). As a result, negative experiences will contribute to the brand's poor reputation. Customers have a negative attitude toward the risks associated with the arrival of the product at the right time or in the right place, and thus the accumulation of bad experiences with a specific store creates a low mental image and reputation for the brand.

The brand's reputation has a positive impact on online shopping. The brand's good reputation is the result of many positive experiences from purchasing from this store. As a result, the greater the online store's good reputation, the greater the opportunity for online purchasing.

The brand's reputation has a positive effect on the relationship between perceived risks and electronic shopping from electronic stores, and we conclude that: Perceived risks have a less negative impact on a customer's purchasing decision when the brand has a good reputation, because the customer ignores the various risks when there are many positive experiences for other customers. In the case of a good reputation, perceived risks have a less negative impact on the customer's purchasing decision. Considering the numerous positive experiences of other customers, the customer disregards the various risks. The good reputation reduces the level of concern about losing privacy and his private data will be available to others. As a result, the customer makes a positive purchasing decision based on the presence of many positive purchasing experiences from this store, ignoring the potential risks of losing privacy and security.

11. Developed model.

The “**Perceived risk reduction model**” (PRR) was developed as a result of this research to understand how customer perceive and evaluate risks in online shopping. The PRR model takes into account factors such as **Financial risk and Privacy & security Risk** that can shape an individual's perception of risk. The brand's reputation was a vital factor in reducing the customer's perceived risks. The PRR model would be a contribution in the marketing field to

reduce the perceived risks and increase the customer attitude to online shopping. The PRR model can be illustrated as follow:

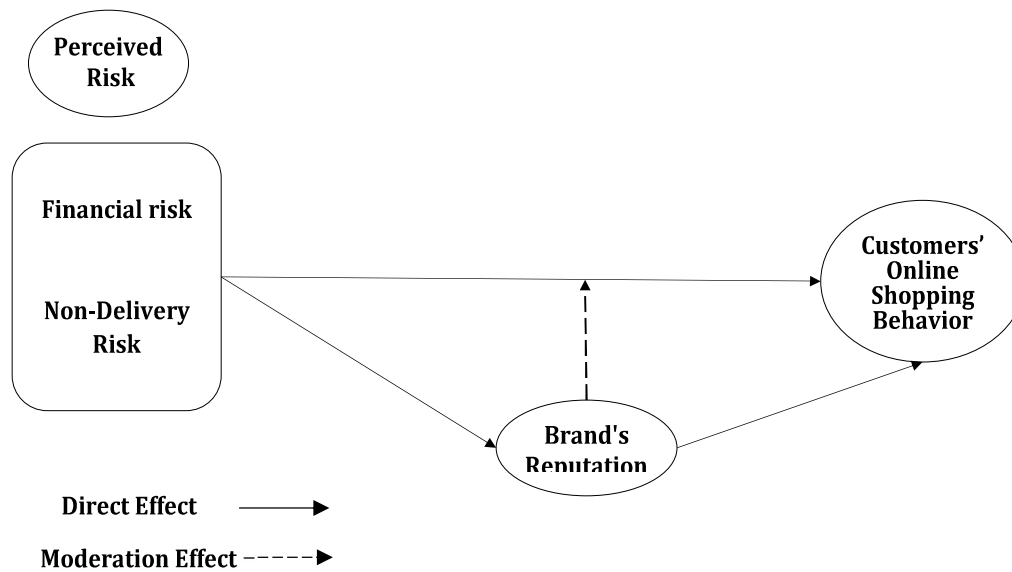


Figure 10. The Perceived risk reduction model (PRR)

It can be clarified that the PRR model agreed with **Perceived Risk Theory** and **The Decision Theory**, whereas the perceived risk factors negatively affect the customer's decision, as well that the overall risk is a negative attitude toward the customer's decision. Another point of view, PRR model deals with **Equity Theory**, whereas it explains the role of customers' brand preferences in predicting online customer behavior. The main contribution of the model, that brand reputation reduces perceived risks of online stores and increases the probability of customers making an online shopping decision.

12. Implications

12.1. Theoretical implications

The current study's findings support the importance of the brand reputation role in moderating the impact of perceived risks on customers' shopping behavior in online stores. Even though the Perceived Risk Theory predicts a negative relationship between the perceived risk and the customer's purchasing behavior, the current study presents developed the “Perceived risk reduction model” (PRR). In which the risks associated with the uncertainty of the consequences of electronic shopping will reduce due to the good brand reputation. So that the moderation of “Perceived Risk x Brand Reputation” will play a positive role in increasing the customer willingness to online shopping.

12.2. Practical implications

The current study helps online retailers in understanding the most effective way to increase sales through the online shopping process. This study can also help online retailers by focusing on the most important perceived risks dimensions in customers view and decreasing their level of risk. This is accomplished through a variety of means, including enhancing customers awareness, improving the quality of the website and mobile applications, and increasing privacy and security in the online payment process. Furthermore, the current study contributes to the development of the best strategy for electronic commerce in order to meet customer needs by reducing various perceived risks and providing a safe platform for online shopping.

13. Recommendations

According to the study's findings, in order to increase sales and online shopping, the level of financial risks and non-delivery risks received by customers during the online shopping process must be reduced. According to the study model, this is related to the level of brand reputation of the online stores. As a result, recommendations can be focused on reducing financial risks as well as reducing the risks of products not arriving on the one hand, while increasing and enhancing the level of brand reputation on the other. The following table contains a set of recommendations:

Table 17: study recommendations

Recommendation	Implementation method	Desired goals	Implementation authority
Reducing the financial risks associated with the purchase process.	Increasing the security and privacy of the website by linking the payment process with a reliable source from the well-known electronic payment process providers in Egypt, such as Vodafone cash, Fawry, or Aman.	The goal is not to be exposed to commercial fraud or fraud and lose money during the payment process, as well as not to expose the website to hacking or theft of business data.	Retailer with payment system and website developers
	Enhancing the quality of the website	The aim is to make it easy for the customer to deal with the website, the speed of the purchase process, and the perceived comfort in the eyes of the customer from using the website.	Web designers with the retailer

Continued →

Recommendation	Implementation method	Desired goals	Implementation authority
	Increasing customer awareness.	The goal is to increase the customer's understanding and awareness of the most common mistakes repetition among online shoppers	The marketing department
Reduce the risk of privacy & security	Employee customer awareness about unsafe procedures during online transactions	Prevent unsafe procedures and enhance customer trust	Customer service
	Regular Security Updates	Stay proactive in applying security patches and updates to online purchasing system and related software	It and innovation department
Increase the brand' s reputation	Continuous promotion of the brand and focus on it	To make it possible to express opinion and comment within the website or mobile application	The marketing department
	Promoting good experiences of previous customers	To improve the mental image of customers for the brand and treating problems with bad experiences as soon as possible and compensating their owners	Web designers with marketing department
	Using social media platforms such as Facebook and Twitter to increase momentum in improving the brand image its reputation	Increase the crowdsourcing on social media platforms in order to enhance the reputation of the brand.	Marketing department

14. Research Limitations and Future Direction

The current study's limitations are that it was applied to customers of online stores in Egypt and that it relied on four dimensions of perceived risk (financial risk – product risk – non-delivery risk – privacy and security risk), which are the most used according to a review of studies.

We can suggest a set of future studies, including re-testing the current study model in different countries. The current study also focused on four of the dimensions of perceived risk. Therefore, we recommend re-testing other factors of perceived risk such as (return policy risk, convenience risk, perceived time risk, social risk, psychological

risk) moderated by the brand's reputation. Also, investigate the impact of perceived benefit dimensions (Convenience, Product selection, Ease of shipping, Enjoyment) on perceived risk, as well as the impact of both on online shopping.

Also, the mediation of “brand awareness” or “trust” and its effect on reducing perceived risk can be tested. UTAUT theory and Theory of Planned Behavior can also be used to investigate the effect of behavioral intention on customer behavior in shopping online.

A suggested model for future studies based on the current study is presented in the figure below:

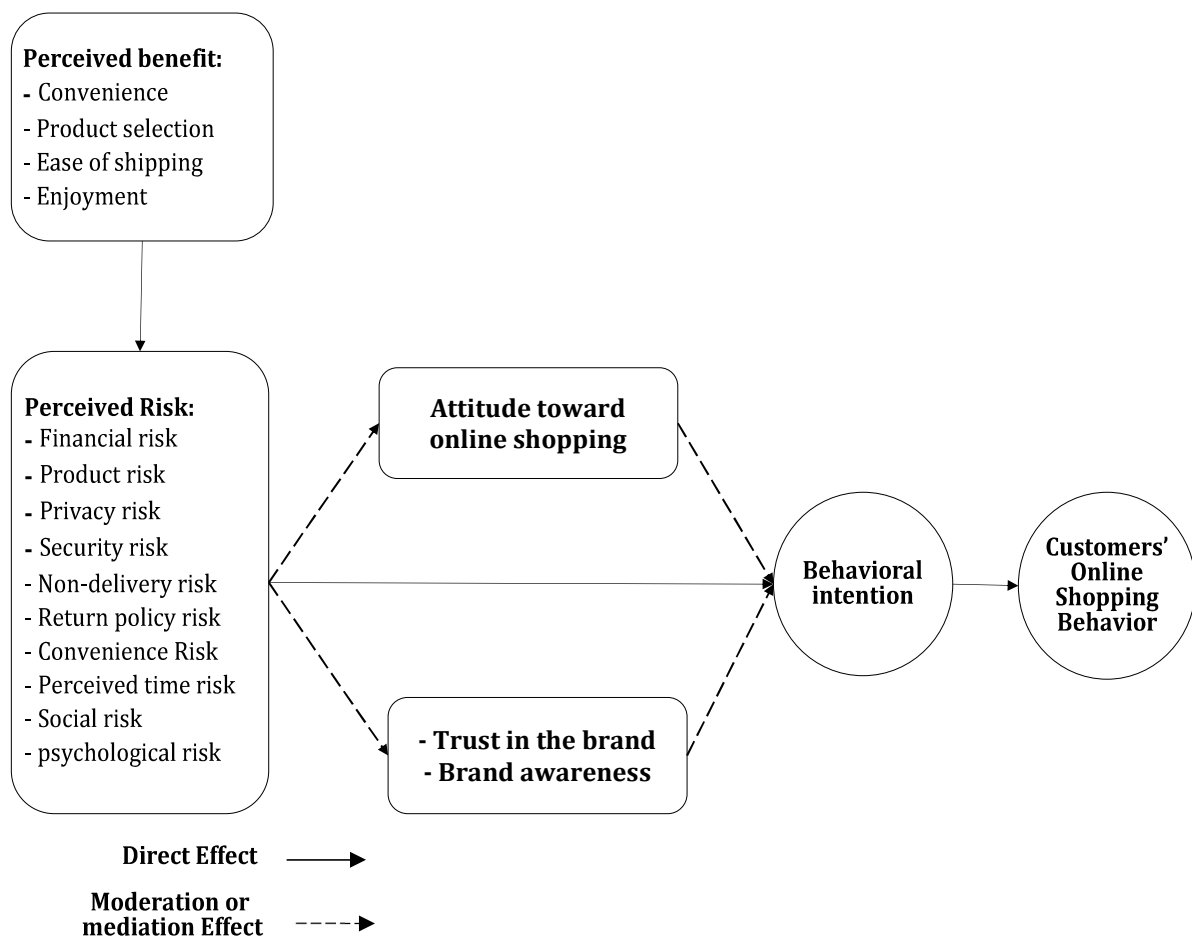


Figure 11: Proposed model for future research

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17. Appendix A:

Variables	Statements
Financial risk (FR)	FR1: If I bought something on the internet, I would be concerned that I wouldn't receive my money's worth. FR2: I feel that my credit card number may not be secure. FR3: If I shop online, I might be overcharged.
Product risk (PR)	PR1: I might not get the items I ordered when shopping online. PR2: Online product quality evaluation is difficult. PR3: I am unable to examine and handle the actual object. PR4: Online testing of the item is not possible.
Non-delivery risk (NDR)	NDR1: The delivery may be delivered to the incorrect location. NDR2: Sellers may fail to deliver on time. NDR3: When shopping online, it is difficult to cancel orders.
Privacy and security risk (PSR)	PSR1: This website does not provide adequate online security. PSR2: This website's online payment system is not secure. PSR3: I'm not sure how capable the website is of dealing with hacking issues. PSR4: I am concerned that the website may not protect my personal information.
Brand reputation (Rep)	Rep1: The online store I deal with is well known and reliable Rep2: This online store has a good reputation in the online market. Rep3: The online store I deal with has a good reputation
Online shopping behavior (OS)	OS1: I prefer online shopping than traditional shopping way. OS2: I use online shopping for not easily available in the nearby market or are unique. OS3: I shop online as i get broader selection of products online. OS4: Using Online stores produce more facility of easy price comparison.

نموذج مقترح للدور الوسيط لسمعة العلامة التجارية في العلاقة بين المخاطر المدركة وسلوك العملاء تجاه التسوق عبر الإنترنت في مصر

ملخص البحث:

تهدف هذه الدراسة إلى تحديد مدى تأثير سمعة العلامة التجارية في العلاقة بين المخاطر المتصورة وسلوك العملاء تجاه التسوق عبر الإنترنت في مصر. تم تطبيق الدراسة على المتاجر المتاحة على الإنترنت في مصر مثل (Amazon، Olx، Jumia، Noon، وغيره). يتبع هذا البحث المنهج الوصفي التحليلي، وتم جمع البيانات من 474 عميل باستخدام استبيان الكتروني. تم إجراء التحليل الإحصائي على برنامجي SPSS V 22 و AMOS V 22. تم استخدام نمذجة المعادلة الهيكلية لاختبار فرضيات الدراسة. أشارت النتائج إلى وجود تأثير سلبي لأبعاد المخاطر المدركة (المخاطر المالية، ومخاطر الخصوصية والامان) على سلوك التسوق عبر الإنترنت. وكذلك، تؤثر سمعة العلامة التجارية بشكل إيجابي على سلوك التسوق عبر الإنترنت. بالإضافة إلى معنوية الدور الوسيط لسمعة العلامة التجارية بين أبعاد المخاطر المدركة (المخاطر المالية، ومخاطر الخصوصية والامان) وسلوك التسوق عبر الإنترنت. كما طورت الدراسة أيضاً نموذج "الحد من المخاطر المتصورة" (PRR).

الكلمات المفتاحية - نموذج الحد من المخاطر المتصورة (PRR)، التجارة الإلكترونية، سلوك التسوق عبر الإنترنت، سمعة العلامة التجارية، المخاطر المتصورة.